Applications of Jumping Models

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Abstract

The aim of this research study is the exploration of so-called jumping formal language models. Firstly, jumping finite automata models are introduced. They behave like classical finite automata, except for their ability to not only read the input string symbol by symbol from left to right, but also perform arbitrary jumps anywhere within the input string. This means that jumping finite automata accepts all permutations of some regular language. Another member of the jumping models family are jumping grammars, which are inspired by the previously mentioned model. In ordinary regular grammars with a sentence form and a corresponding rule, the left-hand side of the rule is substituted by the right-hand side in its corresponding sentence form. However, in jumping grammars, the right-hand side of the rule can be inserted in a different position than the reciprocal left-hand side in sentence form. Moreover, other jumping models, such as the Watson-Crick jumping finite automata, are discussed. Finally, a wide range of applications, including topics of bioinformatics or text processing for all mentioned models are covered.

Keywords: Jumping Finite Automata, Jumping Models, Jumping Grammars